

# NIH News in Health

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## When the Weather Gets Cold Winter Health Problems

Bright blue skies, blankets of snow, crisp days and cozy nights by a crackling fire. For many people, winter is a welcome time of year. But for people with certain diseases like arthritis, it can be a pain—literally. While cold weather doesn't cause arthritis or most other conditions that get worse when temperatures drop, it can cause problems for people who have them. If you've got one of these conditions, here's what you need to know to survive winter's chill.

"Weather affects different people differently," Dr. Mark Gourley of NIH says. "Some people actually prefer cold weather, but many people with **rheumatoid arthritis** or **lupus** will be more stiff in the morning. It can take them longer to get up and loosen their joints and get going."

There's very little research showing that cold weather directly causes arthritis or alters its course. So why does the cold seem to make arthritis feel worse?

As the weather changes, so can the pressure in your joints. If you think of the tissues surrounding the joint as a balloon, Gourley explains,

the balloon around the joint will expand a little when air pressure is low. The expanding tissues put pressure on the joint. People can actually feel changes in air pressure in their joints, which is why some people say they can predict the weather by the pain in their joints.

"Do what you can to keep warm," Gourley says. "Bundle up from head to toe in several layers, preheat the car before getting into it and make sure your home or apartment is kept warm." Other suggestions: Sleep under an electric blanket, warm clothing in the dryer before dressing and drink warm or hot drinks, such as coffee, tea or hot chocolate.

It's also important to keep moving, Gourley says. Try exercising the affected joints before going out in the cold weather. It also helps to maintain a regular exercise program year round. Exercise will not only loosen stiff joints, but will help prevent winter weight gain that puts more stress on painful joints.

Joint stiffness isn't the only problem low temperatures can cause. Raynaud's disease is a condition in which the blood vessels quickly narrow, reducing the flow of blood and causing the skin on the fingers, toes and even the nose to temporarily turn white, then bluish. As blood flow returns, the skin turns red and



becomes painful. In rare severe cases, Raynaud's can cause skin sores or tissue death (gangrene) at the tips of the fingers and toes.

As with arthritis, the best advice for people with Raynaud's is to keep warm. "Wear mittens as opposed to gloves," Gourley advises. That way, the fingers can help keep each other warm. See the article in last month's issue for more about Raynaud's.

Sjögren's syndrome is another condition that can get worse in colder

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### Definitions

#### Lupus

A disease in which your immune system mistakenly attacks healthy cells and tissues. It can affect many parts of the body.

#### Rheumatoid arthritis

A disease in which your immune system mistakenly attacks your joints, causing pain, swelling, stiffness and loss of function.

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weather. In Sjögren's syndrome, the **immune system** attacks the body's moisture-producing glands, leading to dryness of the eyes, mouth and other tissues. Cool, dry weather can exacerbate the situation.



### Wise Choices Chilly Problems

If you have a health problem that gets worse in the cold, talk to your doctor about what to do. Here are some ideas for keeping warm, comfortable and safe:

- Bundle up from head to toe in several layers.
- Use a face mask that warms the air you breathe.
- Preheat the car before getting into it.
- Keep your home warm.
- Sleep with an electric blanket.
- Warm clothing in the dryer before dressing.
- Drink warm or hot drinks, such as coffee, hot tea or hot chocolate.
- Run a humidifier to raise the humidity level in your home.
- Use lotions on your skin.
- Keep physically active.
- Avoid falls. Use handrails, keep sidewalks free of snow and ice, and wear shoes with a good grip.

People with Sjögren's syndrome need to add moisture back into the environment when the air is dry. Run a humidifier to raise the humidity level in your home and use lotions after bathing to keep skin moist. Use artificial tears for dry eyes and keep a water bottle on hand to sip to relieve dry mouth. Be careful about using mouthwashes with alcohol or over-the-counter cold remedies, either of which can worsen dryness.

Many prescription medications, including antidepressants and high blood pressure medications, can also cause dry mouth. If you're taking these medications and having trouble with dry tissues, ask your doctor about the possibility of changing your medication or combating dryness with other treatments. In more severe cases, your doctor may prescribe a medication to increase saliva flow or recommend a simple medical procedure to block the drainage of tears out of your eyes, leaving more natural tears in the eyes to moisten and lubricate them.

Osteoporosis—in which the bones become porous and prone to fracture—may not itself worsen with



### Definitions

#### Asthma

A chronic lung disease that causes wheezing, coughing, chest tightness and trouble breathing.

#### Immune System

The system that protects your body from invading viruses, bacteria and other microscopic threats.



### Web Links

For links to more about winter health problems, see this story online:

<http://newsinhealth.nih.gov/2009/January/feature1.htm>

cold. However, icy steps and walkways in the wintertime can present a particular danger to people whose bones are fragile. Slipping and falling can cause painful fractures that can be slow to heal and even disabling.

If you have osteoporosis, in addition to following the treatment plan your doctor prescribes, it's important to take measures to reduce your risk of falling. Make sure you have handrails on your porch, keep sidewalks free of snow and ice, and avoid wearing shoes with slippery soles. If you take medications that affect your balance or stability, ask your doctor about the possibility of changing medications, or at least the timing of medications so that they're less likely to interfere with daytime activities.

Cold weather may also affect people with certain lung diseases. For example, **asthma** can be triggered in some people by physical activity in cold weather. Rheumatoid lung disease, caused by the same immune response that affects the joints of people with rheumatoid arthritis, is characterized by shortness of breath, cough, chest pain and fever. For people with rheumatoid lung disease, winter air can aggravate problems breathing.

"If you have marginal breathing capacity and you compromise that in any way," Gourley says, "cold winter air can make breathing worse."

If you have difficulty breathing, try a face mask when you need to go out in the cold. Such masks, which can be found at many outdoor and sporting goods stores, cover your mouth and use the heat from your own breathing to warm the air before it enters your lungs.

If you have symptoms brought on by cold weather, be sure to mention them to your doctor. ■

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# Understanding Human Behavior

## Using Computers to Improve Our Health

Can we use computers to understand generosity? The behavior of crowds? The root of prejudice? Can we use computers to improve society? Researchers have recently made a lot of progress in developing computer models to improve our understanding of human behavior and the world we live in.

If you really think about it, each one of us is already a modeler. We create mental models every time we try to predict the outcome of a sporting event, an election or the stock market. But our mental models are based on limited facts and are skewed by our perspective and assumptions. **Computer models**, in contrast, rely on objective data. They can account for many more factors than the human brain, and they can be tested, adjusted and verified.

Computer models have many potential uses. Simulations of how people behave in the face of natural disasters could help prepare local and national officials to respond. Mathematically capturing the behavior of pests or beneficial insects could improve agricultural practices. And modeling social networks can help doctors develop better strategies to change unhealthy behaviors.

Using computer models, researchers are trying to predict—and propose ways to minimize—the effects of a future flu **pandemic**. Flu outbreaks in 1918, 1957 and 1968 killed millions worldwide. NIH-funded researchers looked at the measures

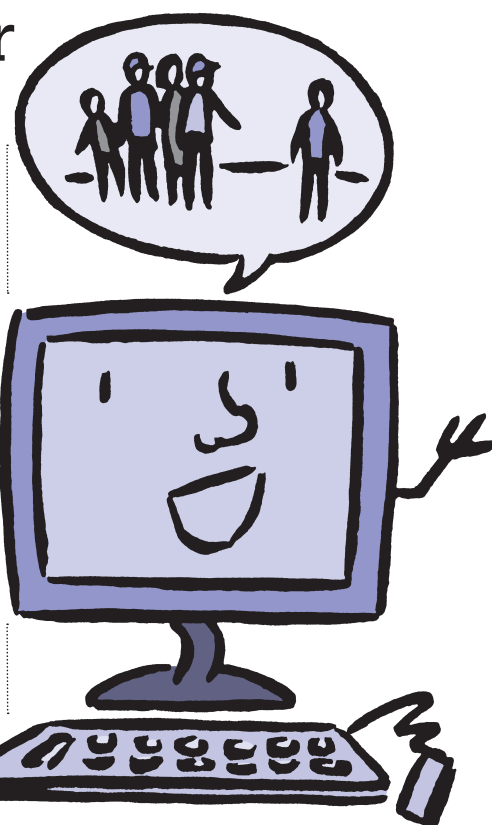
that different health officials took in past pandemics and analyzed their effects. They used this information to build computer models and confirm the models could simulate what happened during past outbreaks. Then they used them to simulate an outbreak of pandemic flu as it spread throughout a large city.

The simulations helped researchers identify public responses that could significantly slow the spread of infection. Tactics like closing schools and giving anti-viral treatments, the models found, could give researchers more time to develop vaccines. The models are also helping researchers understand how people react to these public health measures and how to optimize their timing.

Computer models can help researchers combat other diseases, too. Last year, NIH-funded researchers created a computer model of cholera transmission in Matlab, Bangladesh. Cholera bacteria, which spread through contaminated water and food, can cause severe symptoms that include diarrhea, vomiting and leg cramps. The disease can lead to death by dehydration in a matter of hours if left untreated.

The computer simulation showed that cholera transmission could be controlled if about 50% of the population got an oral vaccine. Public health officials now know they could likely control cholera with a modest investment using a mass vaccination program. These types of models can help health officials figure out which vaccination strategies would work best in different settings.

Last year, NIH-funded researchers computerized weight, height and other data collected over a 32-year period from a socially intertwined network of over 12,000 adults. They found that friendships can have a crucial influence on a person's weight. In fact, the likelihood of becoming obese increased by nearly 57% if a



close friend had become obese.

This year, using the same technique, the scientists reported that close relationships exert a strong influence on smoking. The greatest effect was in married couples. When a husband or wife quit smoking, it reduced the chance of their spouse smoking by about 67%.

This research suggests that it may be possible to harness social networks to help people change behaviors, such as smoking, for the better.

No computer model is perfect. Even the best can only take into account the things that we know about and can measure. Modelers also routinely have to make decisions about what to include and exclude.

Researchers continue to design and test new computer models. As they improve, they give researchers new insights into the most effective ways to affect people's health. ■



### Definitions

#### Computer model

A computer program that predicts the results of a series of complex events.

#### Pandemic

An infectious disease outbreak that spreads to people in many different parts of the world.



### Web Links

For links to more about computer modeling research, see this story online:

<http://newsinhealth.nih.gov/2009/January/feature2.htm>



# Health Capsules

For links to more information about these topics, visit this page online:  
<http://newsinhealth.nih.gov/2009/January/capsules.htm>

## CAM Widely Used

About 38% of adults in the United States and nearly 12% of children use some form of complementary and alternative medicine (CAM), according to a new government survey. Overall CAM use among adults has remained relatively steady since a similar survey in 2002. However, there were significant increases in some types, such as deep breathing, meditation, massage therapy and yoga.

CAM is a group of diverse medical and health care systems, practices and products that are not generally considered to be part of conventional medicine. The 2007 survey results are based on data from more than 23,300

interviews with American adults and more than 9,400 interviews with adults on behalf of a child in their household. The survey included questions on 36 types of commonly used CAM therapies.

The most common uses of CAM in adults are for back and neck pain, joint pain, arthritis, anxiety, cholesterol, head or chest colds and other musculoskeletal conditions.

"The data point out the need for patients and health care providers to openly discuss CAM use to ensure safe and coordinated care," said Dr. Josephine P. Briggs, director of NIH's National Center for Complementary and Alternative Medicine. ■



## Statistics CAM in the U.S.

Most commonly used CAM therapies among U.S. adults:

- Natural products other than vitamins and minerals—such as fish oil/omega 3, glucosamine, echinacea and flaxseed (17.7%)
- Deep breathing (12.7%)
- Meditation (9.4%)
- Chiropractic or osteopathic manipulation (8.6%)
- Massage (8.3%)
- Yoga (6.1%)

## Supplements Fail to Prevent Prostate Cancer

Two large-scale clinical trials found that vitamin E, vitamin C or selenium supplements don't reduce the risk of prostate cancer or other cancers in older men.

Previous studies had suggested that vitamin E or selenium supplements might reduce prostate cancer risk. Smaller studies also hinted that vitamin C might help to prevent prostate and other cancers.

NIH-funded researchers tested how prostate cancer and total cancer risk is affected by the dietary supplements. One research group recruited more than 35,000 men, age 50 and older, who had no evidence of prostate cancer. The men were randomly assigned to receive selenium, vitamin E, both or inactive placebo pills.

The study was cut short in late

2008, after an average follow-up of about 5.5 years. That's because the supplements seemed to offer no cancer-related benefits.

The second trial looked at vitamin E and C supplements. More than 14,000 male doctors, age 50 or older, were randomly assigned to take either vitamin E, vitamin C, both or a placebo. After an average follow-up of about 8 years, neither vitamin—alone or in combination—significantly reduced the risk of prostate or other cancers compared to the placebo group.

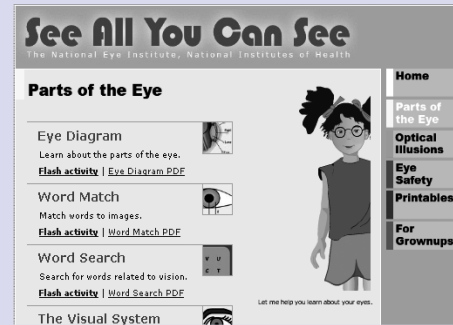
Dietary supplements can often seem beneficial in small studies. The new studies highlight the fact that large, carefully controlled trials are needed to test whether they really live up to their hoped-for benefits. ■



## Featured Web Site See All You Can See

<http://isee.nei.nih.gov>

Information on vision and the eyes for children 7-10 years old. Learn about the parts of the eye, optical illusions and eye safety. The activities are based on a curriculum developed by NIH in cooperation with the Association for Research in Vision and Ophthalmology.



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